REMARKS

Claims 1-13 remain pending in the application, with Claims 1 and 7 being the independent claims. Claims 1 and 7 are again rejected under 35 U.S.C. § 103(a) as being unpatentable over newly cited Fuller (U.S. Patent Application Publication No. 2003/0095590 A1) in view of Vihriala (U.S. Patent Application Publication No. 2002/0045433 A1) and Nangia (U.S. Patent No. 7,139,237 B2). Claims 2-6 and 8-13 remain objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The Examiner concedes that Fuller does not disclose calculating a frequency offset of the input signal and compensating for that frequency offset, relies on Vihriala for this deficiency, and asserts that it would have been obvious to combine the method and apparatus of Vihriala into the receiver of Fuller. The Examiner also concedes that the combination of Fuller and Vihriala does not disclose applying the method and apparatus to an IFDMA communication system. The Examiner relies on Nangia for this deficiency, and asserts that it would have been obvious to modify the combination of Fuller and Vihriala with the alleged suggestions of Nangia.

Claim 1 recites, in part, estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user.

Fuller describes symbol-directed weighting in parallel interference cancellation, and Vihriala describes a method and arrangement for reducing frequency offset in a radio receiver. Nangia describes a method and system for multirate multiuser modulation.

Fuller generally describes a parallel interference cancellation (PIC) system, where iterations are used to determine the estimated symbols for respective signals associate

with each user. In FIG. 3, Fuller shows how, for a specific time period, an input signal is stored and then separated into signals corresponding to each user and demodulated to recover symbols for each signal using a rake demodulator function 68. Each symbol in each signal is given a weighting based on a symbol-directed processing function 72. 60 composed for time compressing the CDMA codewords for transmission only during allocated timeslots, activating a receiver only during the allocated timeslots to receive and decompress the time compressed CDMA codewords, and decoding the decompressed CDMA codewords to recover the information signals. Fuller nowhere suggests estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user.

Vihriala generally describes receivers where a channel estimator is used for correcting the base band signal. Vihriala monitors the phase of the channel estimation output and generates a complex phasor on the basis of successive phase values. The received baseband signal is then multiplied by the generated complex phasor for compensating the frequency offset. The frequency compensation can be made before or after the channel estimation thus producing a feedback compensation or feedforward compensation. The feedback compensation can be implemented by compensating the baseband signal either prior to the dispreading or after the dispreading. Vihriala nowhere suggests estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user.

Nangia generally describes a multi-rate IFDMA modulation scheme that permits users to transmit at different rates or vary their data rates while providing frequency diversity and preserving low peak-to-average power ratios and orthogonality between users at different data rates. The modulation scheme allows user-specific data block and repetition sizes, as well as user-specific modulation codes. Code assignment rules are provided for maintaining orthogonality between users having different data rates. Block

and phase ramp modulation codes can be used. Asynchronous transmissions by users are supported by ensuring that the length of the cyclic extension is sufficiently long to tolerate worst case relative signal arrival delays between users and the channel pulse response duration over the communication medium. The modulation scheme can be used in wireless communication systems. Nangia nowhere suggests estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user.

In contrast, the present invention relates to compensating for a frequency offset between a transmission signal and a reception signal for a user in an IFDMA system. The present invention estimates the frequency offset from a selection signal, estimates multiple access interferences, and subtracts the estimated multiple access interferences.

The Examiner has shown no areas of Fuller, Vihriala, or Nangia, that even discuss estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user.

More particularly, Fuller, Vihriala, Nangia, or any combination thereof, fails to teach or reasonably suggest a method and apparatus for compensating for a frequency offset between a transmission signal and a reception signal for a u^{th} user ($1 \leq u \leq U$, where U denotes the number of users) in an IFDMA system, where the method includes the steps of: <u>(a) estimating the frequency offset from a selection signal in the IFDMA system that is determined as the reception signal for the u^{th} user in an initial mode and as a feedback signal in a normal mode;</u> <u>(b) estimating multiple access interferences representing an extent to which reception signals for i^{th} other users ($1 \leq i \leq U-1$) at the same time interfere with the reception signal for the u^{th} user;</u> <u>(c) subtracting the estimated multiple access interferences from the reception signal for the u^{th} user and determining the subtraction result as the feedback signal;</u> <u>(d) determining whether steps (a), (b), and (c) have been repeated a predetermined number of times, and if it is determined that steps</u>

(a), (b), and (c) have not been repeated the predetermined number of times, going back to step (a); and (e) if it is determined that steps (a), (b), and (c) have been repeated the predetermined number of times, estimating the transmission signal for the u^{th} user using the feedback signal finally determined in step (c) and the estimated frequency offset, as recited in Claim 1. Fuller, Vihriala, Nangia, or any combination thereof, fails to teach or reasonably suggest an apparatus with similar recitations in Claim 7.

Accordingly, Claims 1 and 7 are allowable over Fuller, Vihriala, Nangia, or any combination thereof.

While not conceding the patentability of the dependent claims, *per se*, Claims 2-6 and 8-13 are also allowable for at least the above reasons.

Accordingly, all of the claims pending in the Application, namely, Claims 1-13, are in condition for allowance. Should the Examiner believe that a telephone conference or personal interview would facilitate resolution of any remaining matters, the Examiner may contact Applicants' attorney at the number given below.

Respectfully submitted,

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